Organometallics 2013 vol.32 N17, pages 4785-4792

Electrochemical ortho functionalization of 2-phenylpyridine with perfluorocarboxylic acids catalyzed by palladium in higher oxidation states

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Abstract

The electochemical oxidation of palladium acetate or palladium perfluoroacetate in the presence of 2-phenylpyridine promotes catalytic ortho C-H substitution reactions. As possible intermediates, Pd(II) metallacycles with Pd-bound acetate, perfluoroacetate, and perfluoroheptanoate substituents have been isolated and characterized: binuclear [(PhPy)Pd(μ-OAc)]2 and [(PhPy)Pd(μ-TFA)]2 and mononuclear [(PhPy)Pd(TFA)](CH 3CN), [(PhPy)Pd(TFA)](PhPy), and [(PhPy)Pd(PFH)](PhPy). The fluorinated derivatives were found to exist in solvent-dependent equilibria between mononuclear and binuclear forms. Cyclic voltammetry was used to elucidate redox properties of the palladacycles and the oxidation route to the final products. © 2013 American Chemical Society.

http://dx.doi.org/10.1021/om400492g